

SAExploration Holdings, Inc Investigation

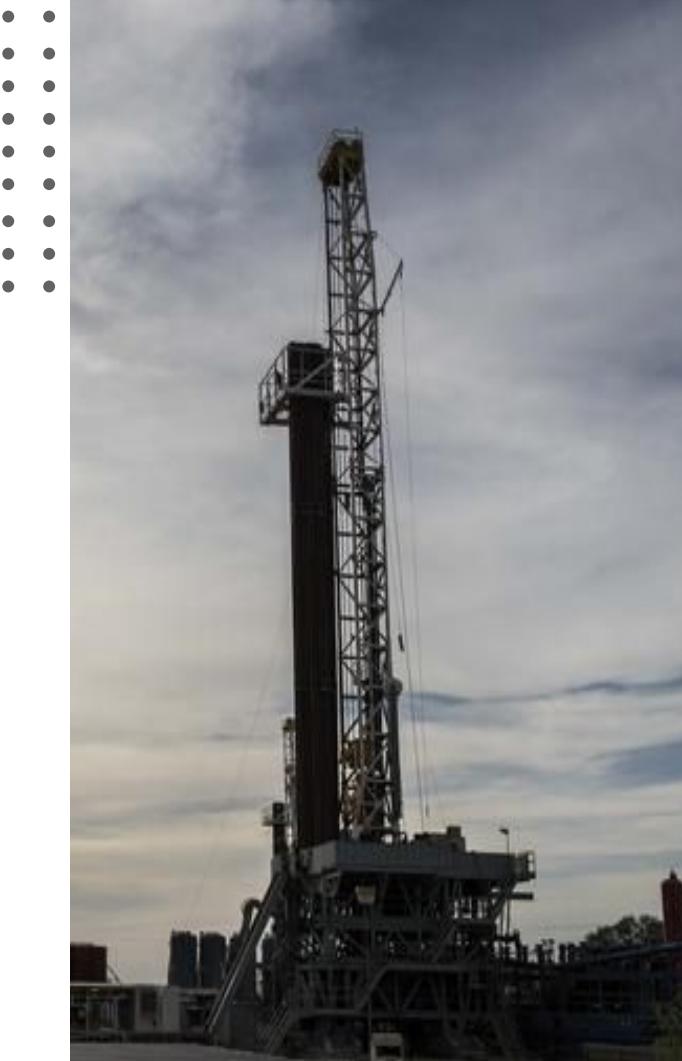
Team 3 : Sixuan Jiang, Pakchi Lau,
Zhi Zhang, Jingyi Zheng





Introduction

- A publicly traded seismic data acquisition company based in Houston, Texas
- Focus on serving large oil and gas companies
- Collect proprietary seismic survey data to identify and assess potential drilling locations



The SAE Executives



Jeffrey Hastings

- ★ Age: 65
- ★ Residence: Anchorage, Alaska, Kelowna, British Columbia, Canada
- ★ Career Highlight (Reverse Chronological Order):
 - Resigned on August 15, 2019, and effective on Nov 30, 2019
 - CEO and Chairman of SAE's Board from 2016 to Aug 2019
 - Executive Chairman of the Board from 2013 to 2016



Michael Scott

- ★ Age: 62
- ★ Residence: Alberta, Canada
- ★ Career Highlights (Reverse Chronological Order):
 - Resigned on September 4, 2020
 - Senior Vice President in 2016
 - Executive Vice President in 2011

Brent Whiteley

- ★ Age: 58
- ★ Residence: Houston, Texas
- ★ Career Highlights (Reverse Chronological Order):
 - Employment terminated by SAE's Board on Aug 15, 2019
 - SAE's CFO, General Counsel, and Secretary from 2011 to 2019
 - Obtained license to practice law in the State of Texas since 1990



Brian Beatty

- ★ Age: 61
- ★ Residence: Ontario, Canada
- ★ Career Highlights (Reverse Chronological Order):
 - Employment terminated by SAE's Board on Dec 2019
 - COO and a member of the Board from 2016 to 2019
 - President and CEO and a member of the Board from 2011 to 2016
 - Expansion and secure market share internationally from 2008 to 2011
 - Founded SAE in 2006
 - Began his career in the seismic industry in 1980



Earning Management Incentives



Oil Price Dropped in 2014

Oil exploration and drilling slowed



Few Customers

Declining business and straining cash flows



Creation of the data library

Strong opposition from board due to high risks



Uncertain Sales

Need return on high up front exploration investment

SAE's Solutions

Create special purpose entity (purportedly unaffiliated third entity) to operate the data library

Entity would provide 3 benefits to SAE:

- **Circumvent opposition from SAE's board and noteholders**
- **Recognize the revenue as it "sold" data to the third-party SPE**
 - Without having to identify and contract with actual end-user customers
- **Take maximum advantage of oil and gas exploration tax credits offered by the State of Alaska**
 - SAE and third-party SPE use Alaska Tax Credits' redemption to generating actual cash flow

Frauds Committed



Period : 2015 - 2019

Setting up SPE controlled by SAE executives

- Fake transactions, invoices and improperly recognized revenue owed to it by SPE
- SPE fail to generate enough cash to pay SAE
 - SAE's accounts receivable increase substantially over time

Monetize the Alaska Tax Credits

- Allowing SPE pay for SAE's invoices and repayment for loans from bank and other financial institutions used to finance SPE

Used SEC's funds for a series of round trip transactions

- Secretly divert millions of money from SAE to make an indirect equity investment in SPE
- The money was sent back to SAE
 - SPE use these funds to pay SAE, and reduce the accounts receivable balance due from SPE to SAE

Executives stole \$6 Millions for themselves

- SAE's executives designed a multi-faceted fraud that enriched executives at the expense of investors.

SPE created by SAE



Alaskan Seismic Ventures, LLC

Operate as a seismic data library company

Palmyra Energy Ventures Fund I, LP

Forza Investments Management, LLC

Global Equipment Solutions, LLC

Speculative Seismic Investments, LLC

Madison River Investments, LLC

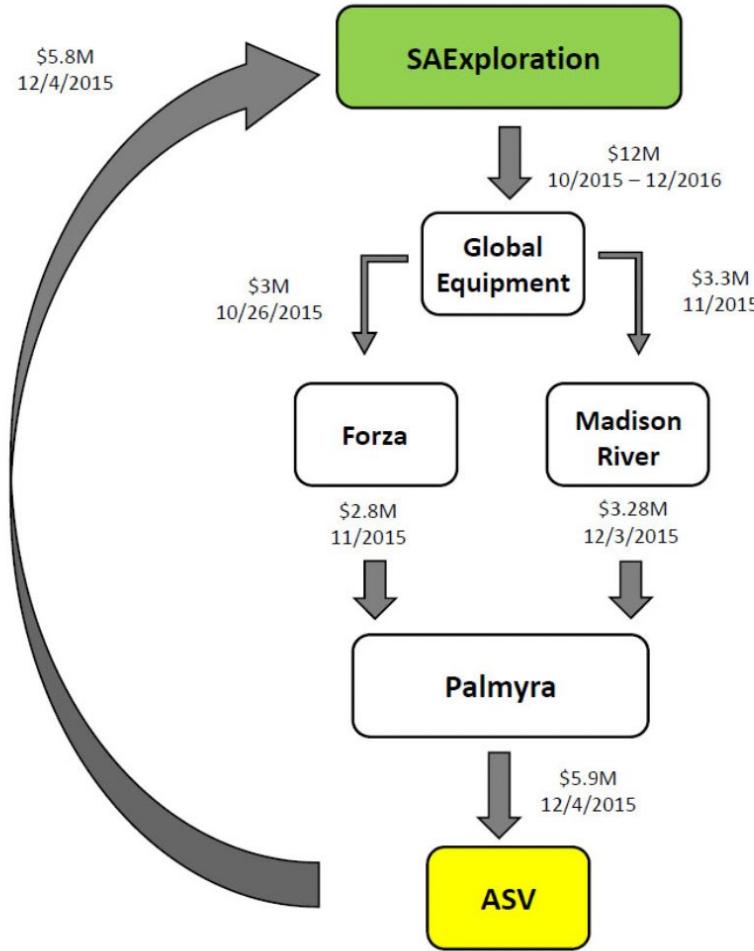




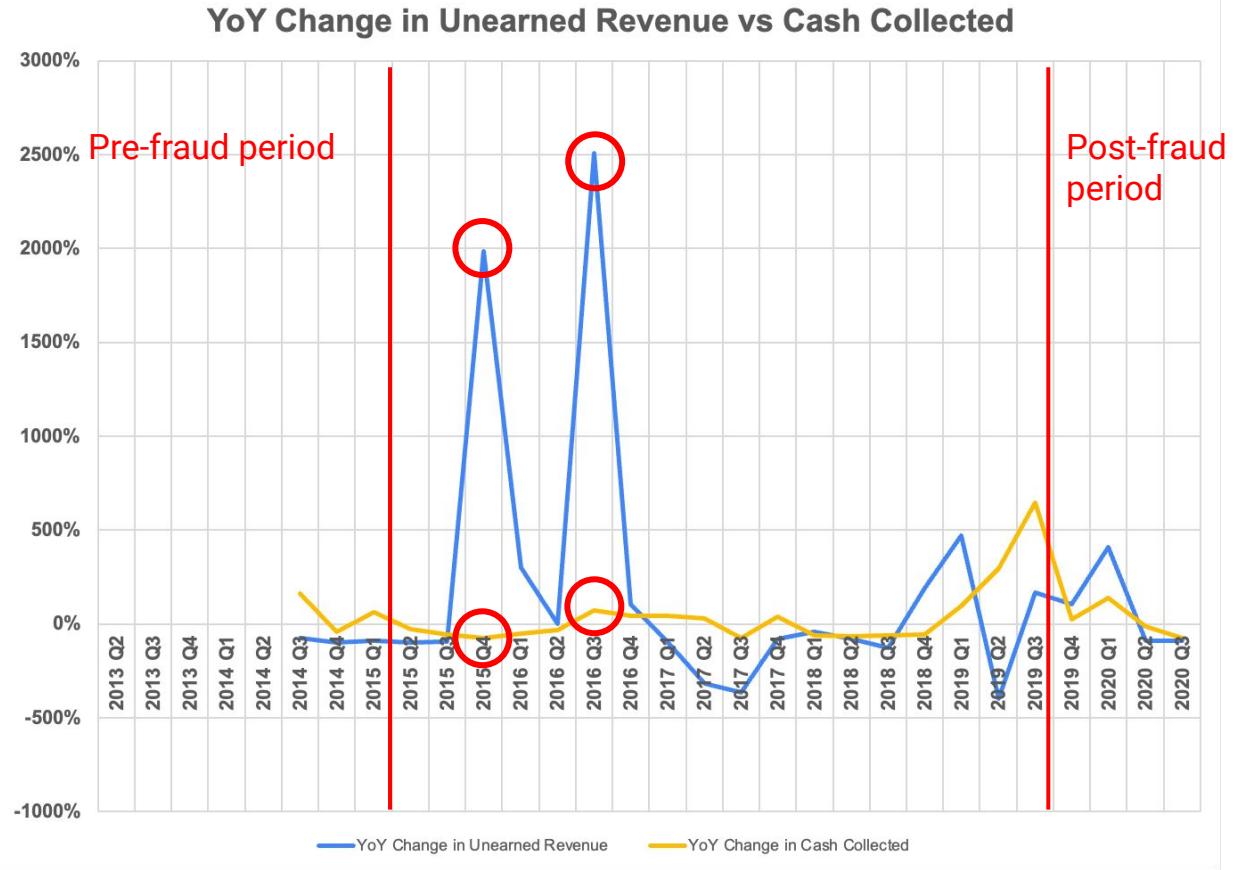
\$100,000,000

Overstate revenue by approximately \$100 million

Round Tripping



YoY Change in Unearned Revenue vs Cash Collected



Potential Earning Management!

Abnormal YoY Unearned Revenue

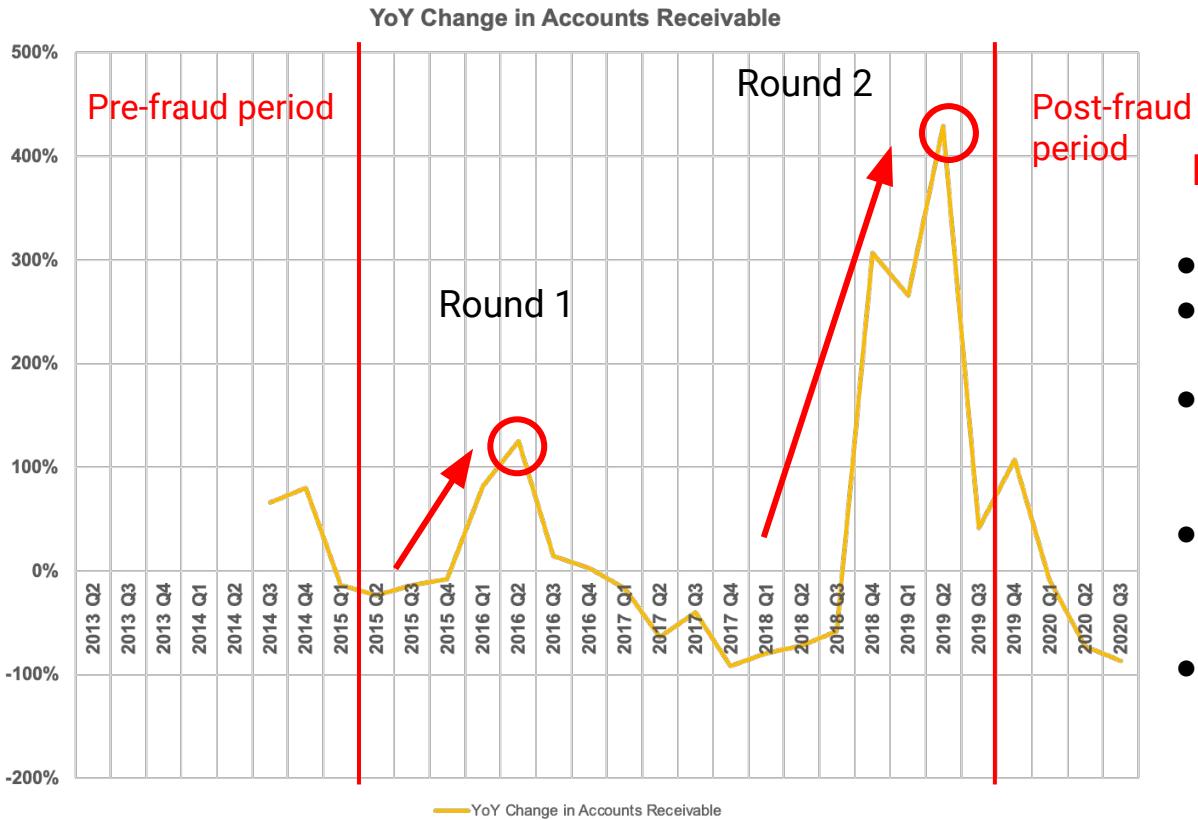
- 2015 Q4: 1987.17%
- 2016 Q3: 2508.70%

But the YoY change in Cash Collected is small

- 2015 Q4: -75.66%
- 2016 Q3: 73.25%

2016 Q2 is 0% due to the missing data
2015 Q2

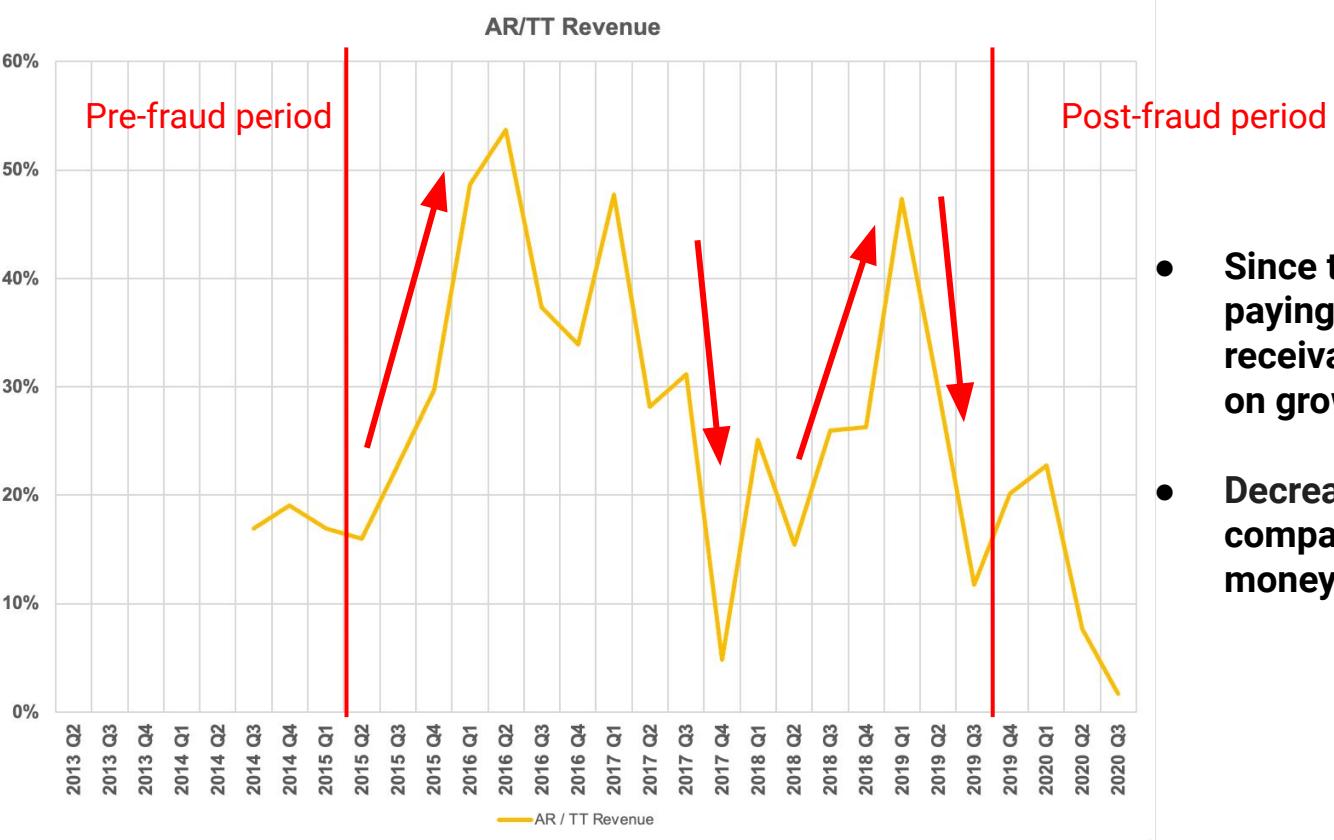
YoY change in account receivable



Potential Fraud

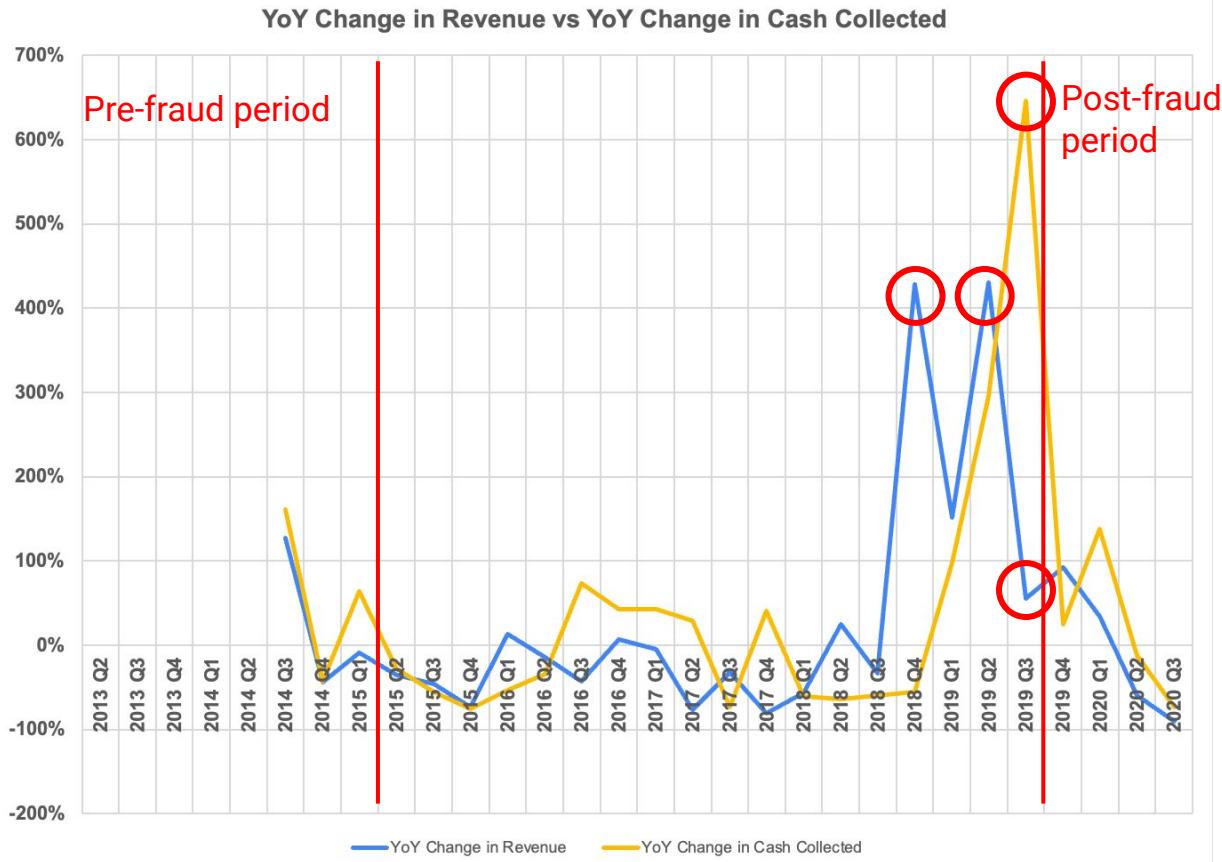
- 2016 Q2: 124.90%
- 2019 Q2: 429.36%
- SAE created a shell company called "ASV"
- SAE increase revenue by selling data to SAV(count into A/R)
- They make secret investment to ASV & let ASV pay them back so as to make A/R looks normal

Account Receivable / TT Revenue



- Since the shell company are not paying by cash, their account receivable percentage is keeping on growing
- Decrease when the shell companies pay it back with the money invested by SAE

YoY Change in Revenue vs Cash Collected



Potential Earning Management!

Abnormal Revenue Growth

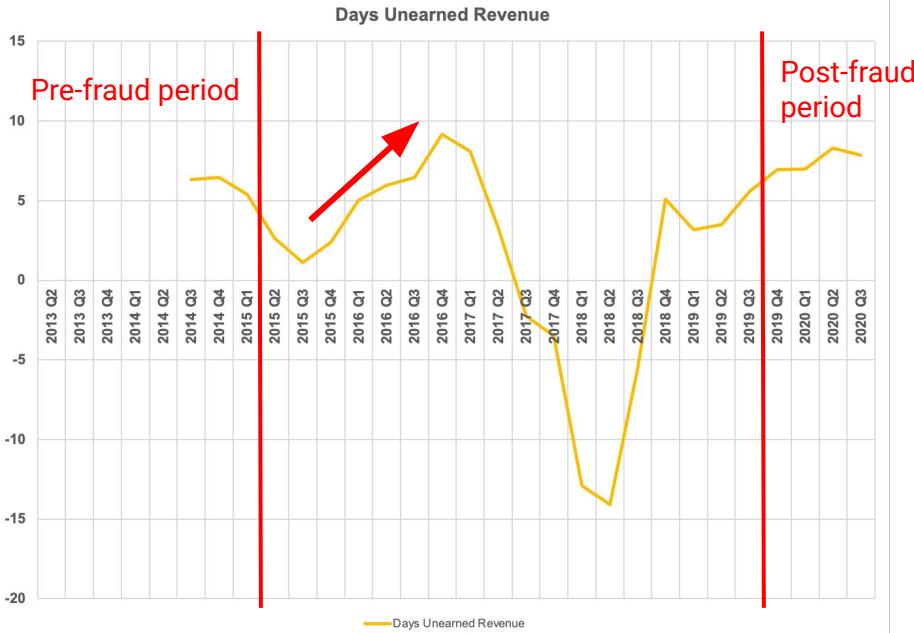
- 2018 Q4: 428.6%
- 2019 Q2: 430.3%

In 2019 Q3:

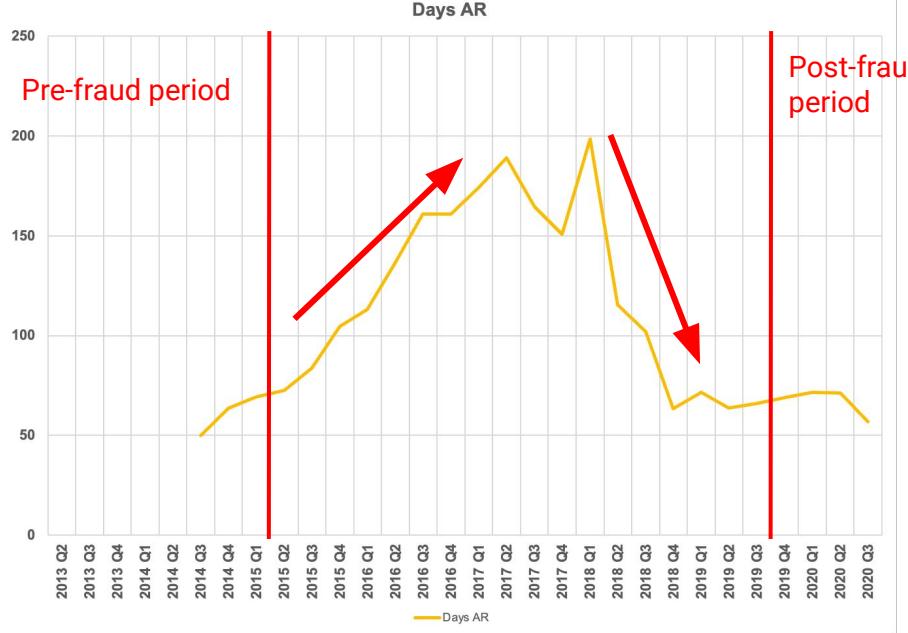
- Growth in Revenue dramatically decreases because they know SEC is investigating them
- Growth in Cash Collected dramatically increases because they need to pay money back

Days Unearned Revenue & Account Receivable

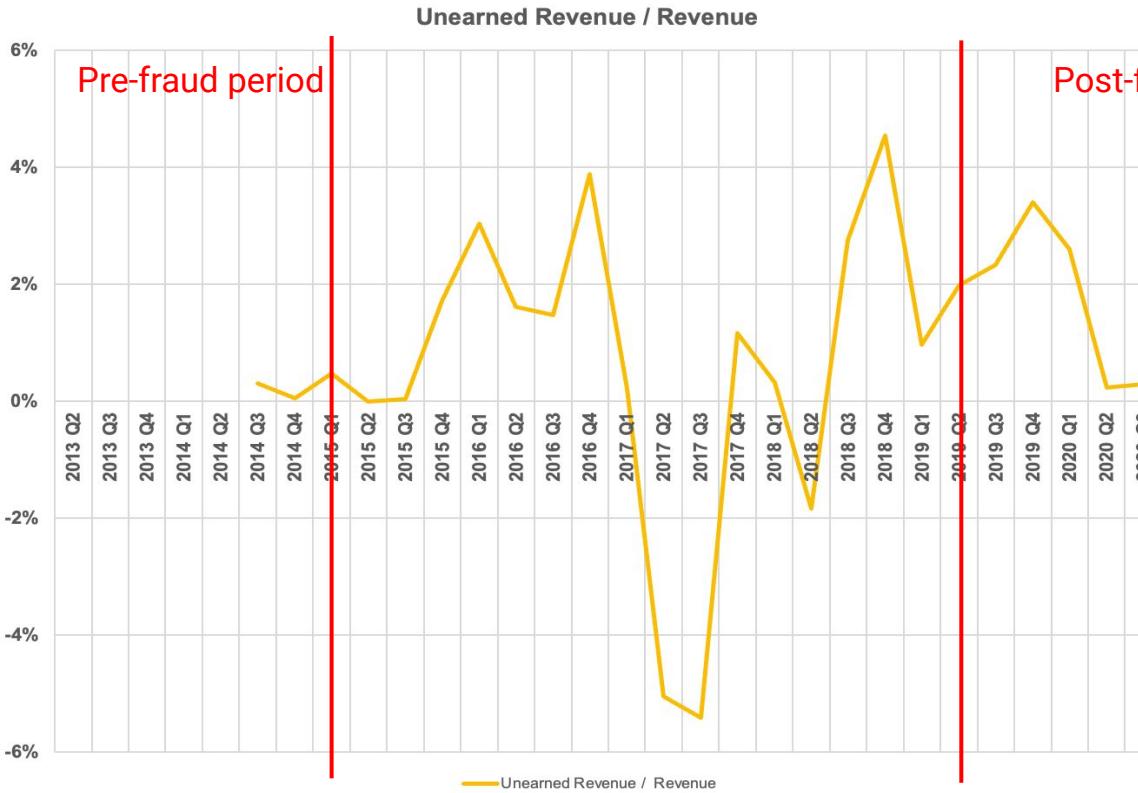
- Days unearned revenue increases from 2015Q3 to 2016Q4 which means it takes the SAE a long period to recognize its' revenue



- Days Account Receivable reaches 189.066 in 2017Q2, which increases almost three times compare to pre-fraud period.
- It decreases rapidly after 2018 Q1(198.72)



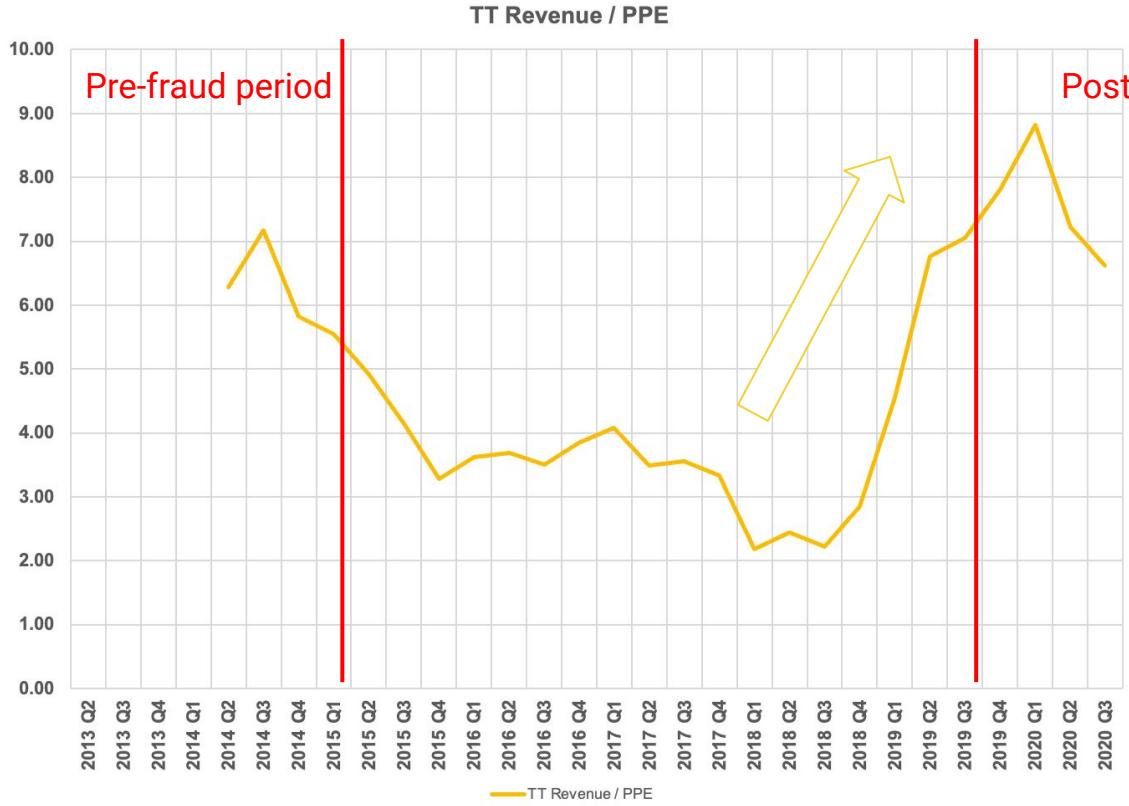
Unearned Revenue / Revenue



- The unearned revenue/revenue ratio stay constant between 2015 to 2019, besides there is a period in 2017 the ratio drops significantly.

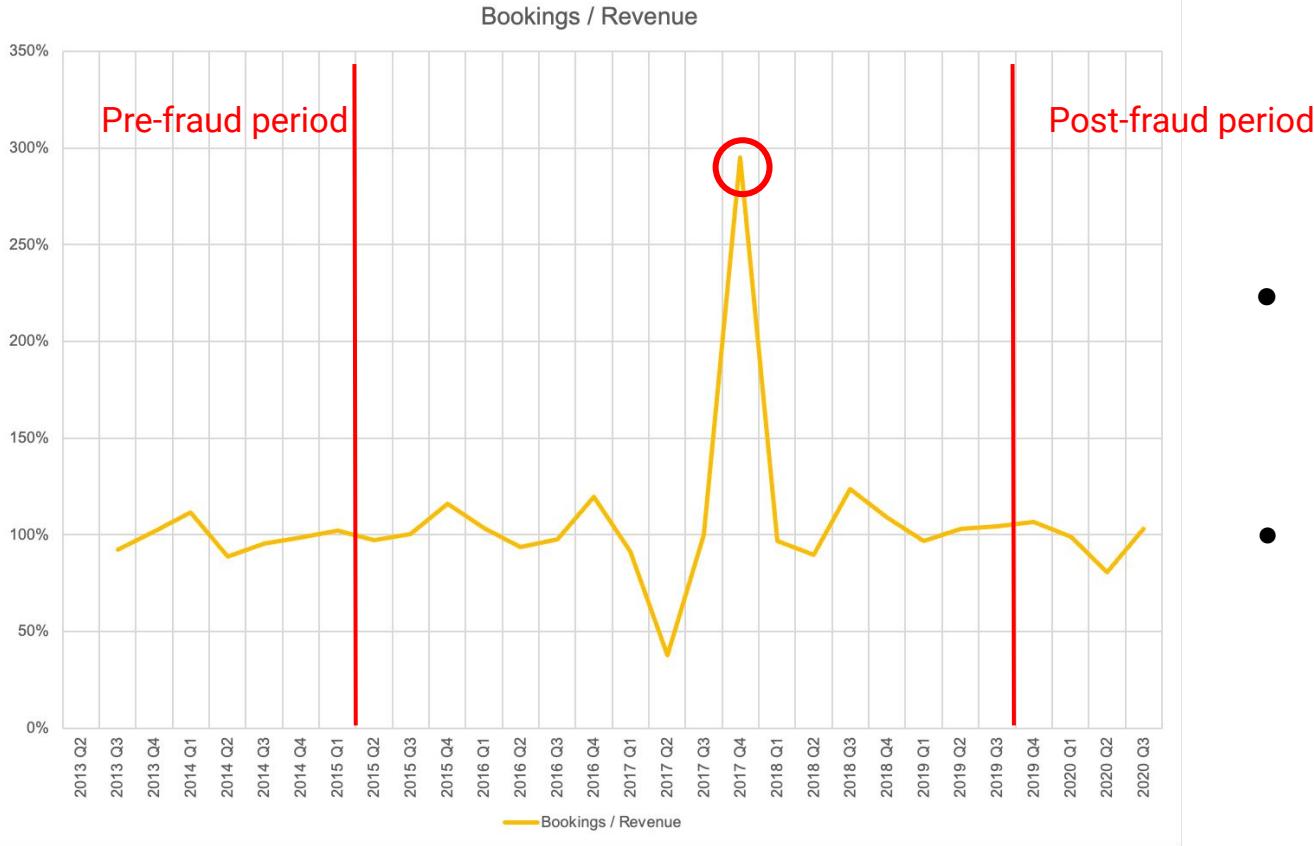
There could be potential manipulation.

TT Revenue/PPE



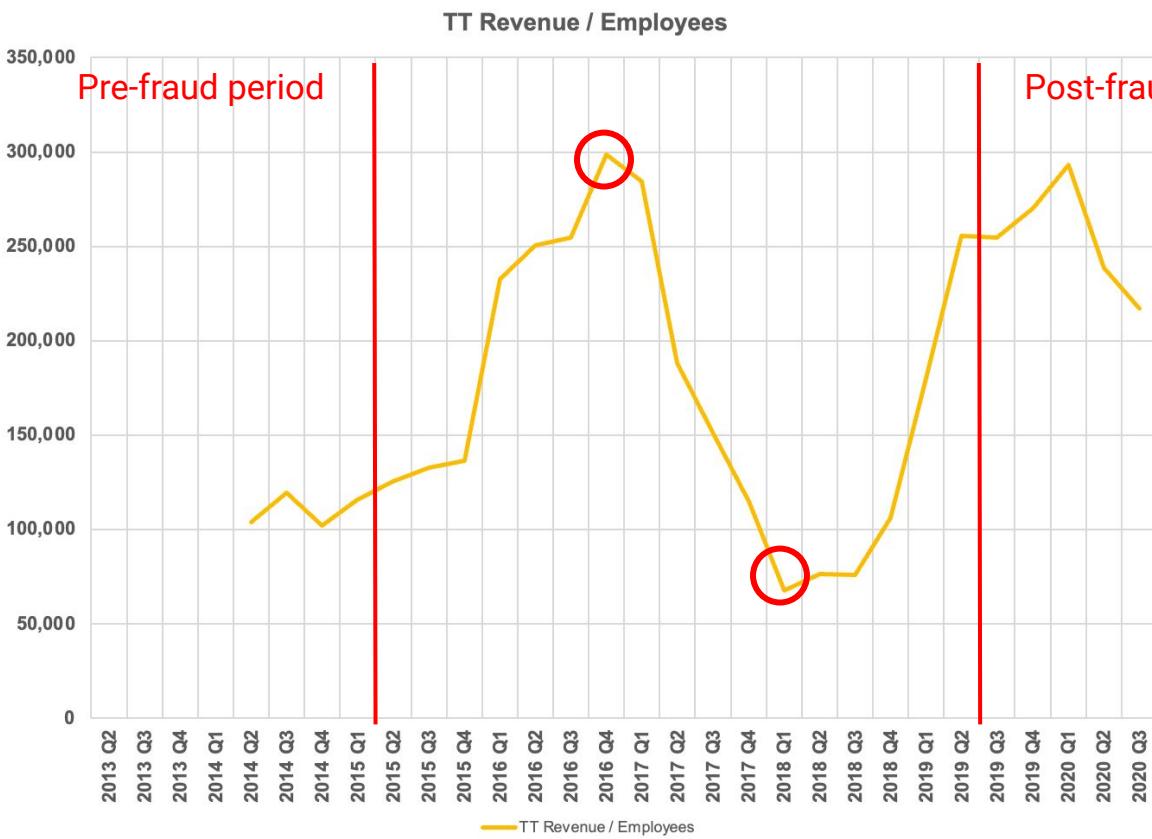
- The sudden increase between 2018Q3 to 2019Q2 shows that the produced revenue is abnormal.
- SAE created fake and back-dated equipment purchase orders from a sham company called Global Equipment so as to make its' secret investment reasonable
- SAR exaggerate the amount of equipment

Bookings / Revenue



- The huge fluctuations between 2016Q4 and 2018Q1 shows that there is potential fraud.
- Sprint in contracts between 2017Q2 and 2017 Q4 shows there's manipulation

TT Revenue / Employees



From 2015 Q2 to 2016 Q4:

- Artificially inflated revenue
- Growth in TT Revenue/Employee shows a continue trend to roughly \$300 thousand by 2016 Q4 as SAE recognized \$141 million in revenue from ASV
- Employees layoff, from 1138 to 576

From 2017 Q1 to 2017 Q4:

- While revenue continue to be misleading, number of employees backs to the 1000's level, causing a downward trend

Aftermath: Punishments to executives who engaged in the fraud



Jeffrey Hastings

August 13, 2021

- Pled guilty

November 15, 2021

Manhattan federal court:

- Sentenced to 3 years in prison + 2 years of supervised release.
- Pay a forfeiture money judgment in the amount of \$590,807.



Brian Beatty

- Awaiting investigation



Michael Scott

- Pled guilty and await sentencing before Judge Woods



Brent Whiteley

- Pled guilty and await sentencing before Judge Woods

After Fraud Timeline

2020

- **Jun. 17** NASDAQ suspended trading in SAE's common stock
- **Aug. 21** NASDAQ delisted SAE's common stock.
- **Aug. 27** Filed voluntary petitions for Chapter 11 of the Bankruptcy Code.
- **Dec. 21** SAE completed its financial restructuring and emerged from Chapter 11 as a private, non-SEC reporting company.

2021

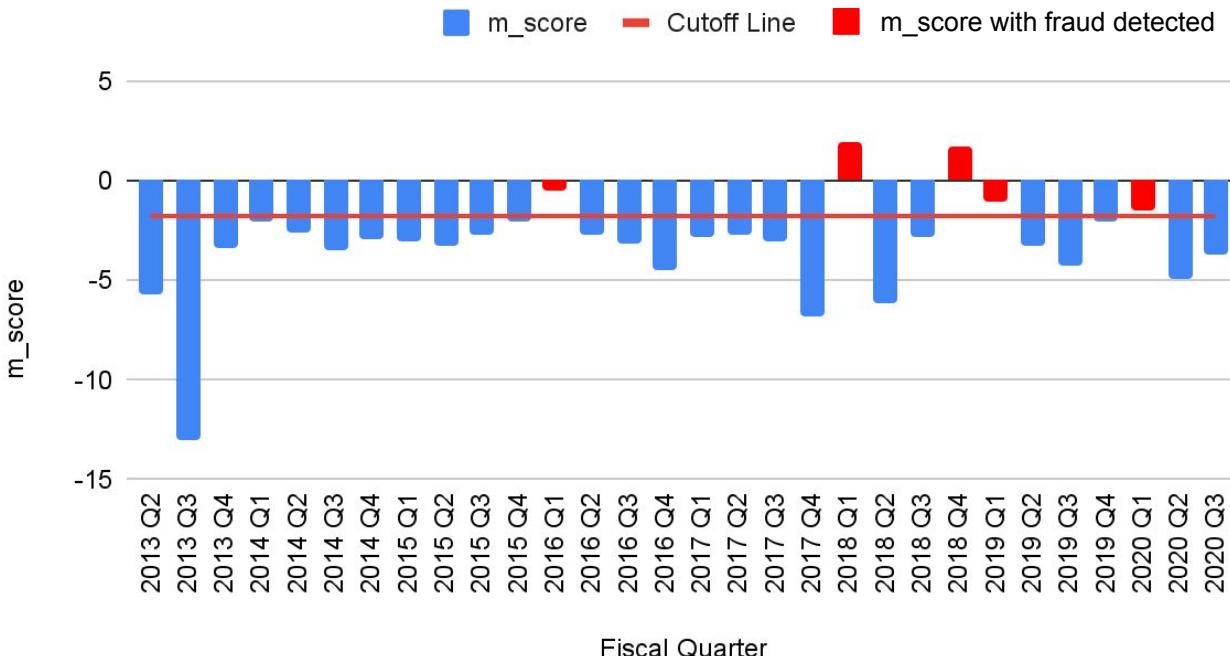
- **Dec. 7** Michael J. Faust, President and CEO, retire from executive positions.

2022

- **Jan. 31** SAE completed a \$26 million recapitalization transaction.

Beneish's M-Score

M-Score By Quarter



Weaknesses:

- Cannot accurately pinpoint fraud period
 - Only reported 4 potential frauds throughout the fraud period (15Q1 - 19Q3)
- Solely relied on the financial ratio
 - Non financial factors can be relevant to detect the earning management

Benford's Law - Data Selection

1. We downloaded all the variables in WRDS.
2. We chose quarterly data after comparison, although quarterly data is less than annual data, quarterly data shows more detailed changes in each period than annual data, so it is easier to detect fraud period
3. We cleaned up the data by deleting rows with missing data and 0
4. Finally we present 165 different data items

The data items I downloaded were chosen based on their relevance to financial analysis and the availability of the data from the source. The data items can be grouped into several categories:

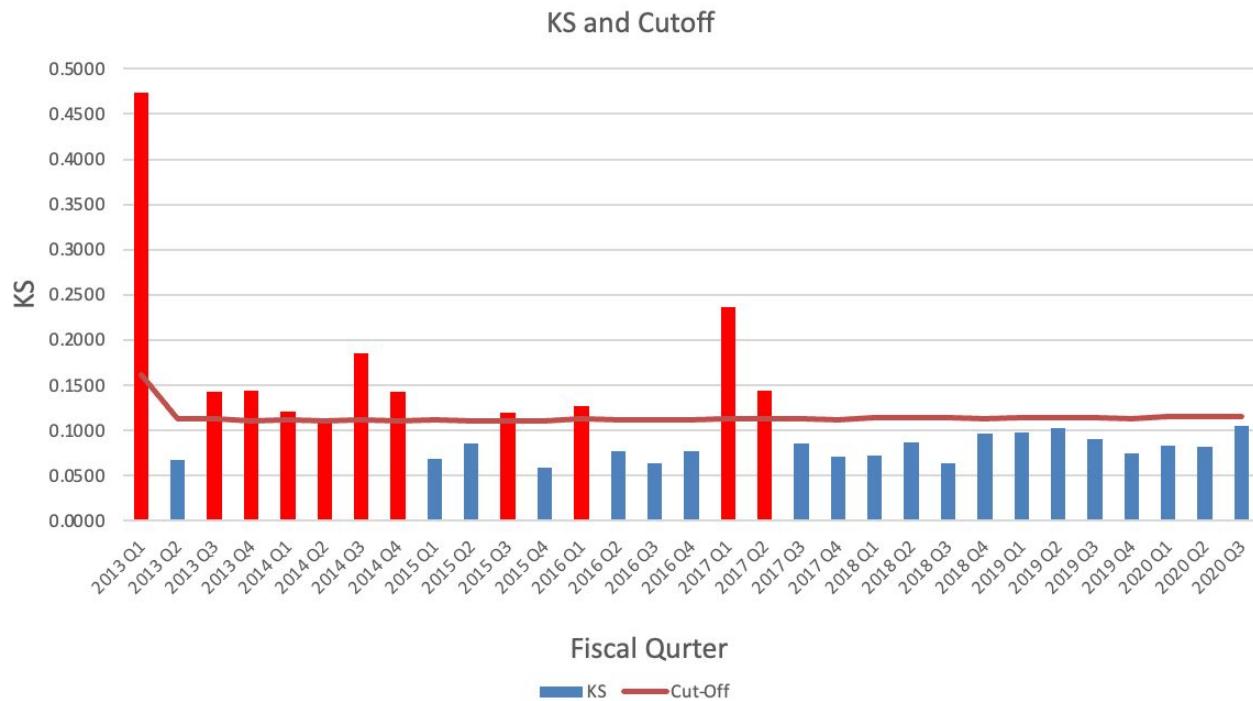
1. **Financial statements:** This includes data such as revenue, net income, cost of goods sold, assets, liabilities, and equity. These are key indicators of a company's financial performance and health.
2. **Earnings per share (EPS) data:** This includes diluted and basic EPS, as well as EPS from operations. EPS is a key metric used by investors to evaluate a company's profitability.
3. **Cash flow data:** This includes data such as cash and short-term investments, cash flow from operating activities, financing activities, and investing activities. Cash flow is an important indicator of a company's financial health.
4. **Balance sheet data:** This includes data such as current and long-term liabilities, current and long-term assets, and working capital. The balance sheet provides a snapshot of a company's financial position at a specific point in time.
5. **Other data:** This includes data such as ticker symbol, fiscal year, fiscal quarter, industry format, and population source. These data items provide context for the financial data and are useful for organizing and filtering the data.

KS score vs Cutoff

Fraud Period	Year	KS	Cut-Off	Fraud Indicator?
None	2013 Q1	0.4736	0.1614	Yes
None	2013 Q2	0.0677	0.1129	No
None	2013 Q3	0.1428	0.1129	Yes
None	2013 Q4	0.1438	0.1099	Yes
None	2014 Q1	0.1207	0.1122	Yes
None	2014 Q2	0.1123	0.1110	Yes
None	2014 Q3	0.1850	0.1118	Yes
None	2014 Q4	0.1421	0.1107	Yes
None	2015 Q1	0.0681	0.1114	No
Fraud	2015 Q2	0.0858	0.1107	No
Fraud	2015 Q3	0.1200	0.1103	Yes
Fraud	2015 Q4	0.0590	0.1110	No
Fraud	2016 Q1	0.1266	0.1129	Yes
Fraud	2016 Q2	0.0769	0.1118	No
Fraud	2016 Q3	0.0634	0.1118	No

Fraud	2016 Q4	0.0765	0.1122	No
Fraud	2017 Q1	0.2365	0.1133	Yes
Fraud	2017 Q2	0.1434	0.1133	Yes
Fraud	2017 Q3	0.0854	0.1133	No
Fraud	2017 Q4	0.0714	0.1122	No
Fraud	2018 Q1	0.0715	0.1137	No
Fraud	2018 Q2	0.0863	0.1141	No
Fraud	2018 Q3	0.0633	0.1137	No
Fraud	2018 Q4	0.0966	0.1126	No
Fraud	2019 Q1	0.0972	0.1137	No
Fraud	2019 Q2	0.1021	0.1141	No
Fraud	2019 Q3	0.0903	0.1145	No
None	2019 Q4	0.0743	0.1133	No
None	2020 Q1	0.0829	0.1154	No
None	2020 Q2	0.0814	0.1154	No
None	2020 Q3	0.1051	0.1149	No

KS score vs Cutoff



- Red bars means the quarter that KS is greater than cut-off indicates the potential fraud at that period.
- Only reported 4 potential frauds throughout the fraud period

Both Benish's M-Score & Benford's Law fails to detect the fraud period

- **Benish's M score:**

- Possible to detect fraud. However, the result is not completely accurate and it is difficult to find the fraud patterns if solely relied on the M scores

- **Benford's Law**

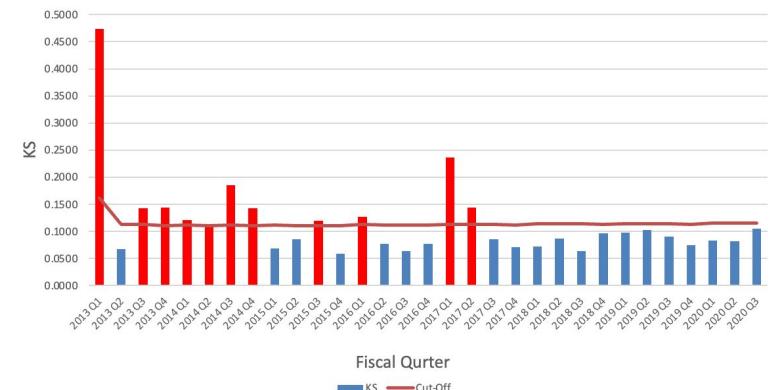
- Possible to detect fraud, and seems more likely to detect the frauds comparing to Benish's M score. However, the accuracy is very low. Benford's law finds fraud for almost every period between 2013 Q1 to 2014 Q2, which are before the fraud period.

M-Score By Quarter



Fiscal Quarter

KS and Cutoff



Fiscal Quarter

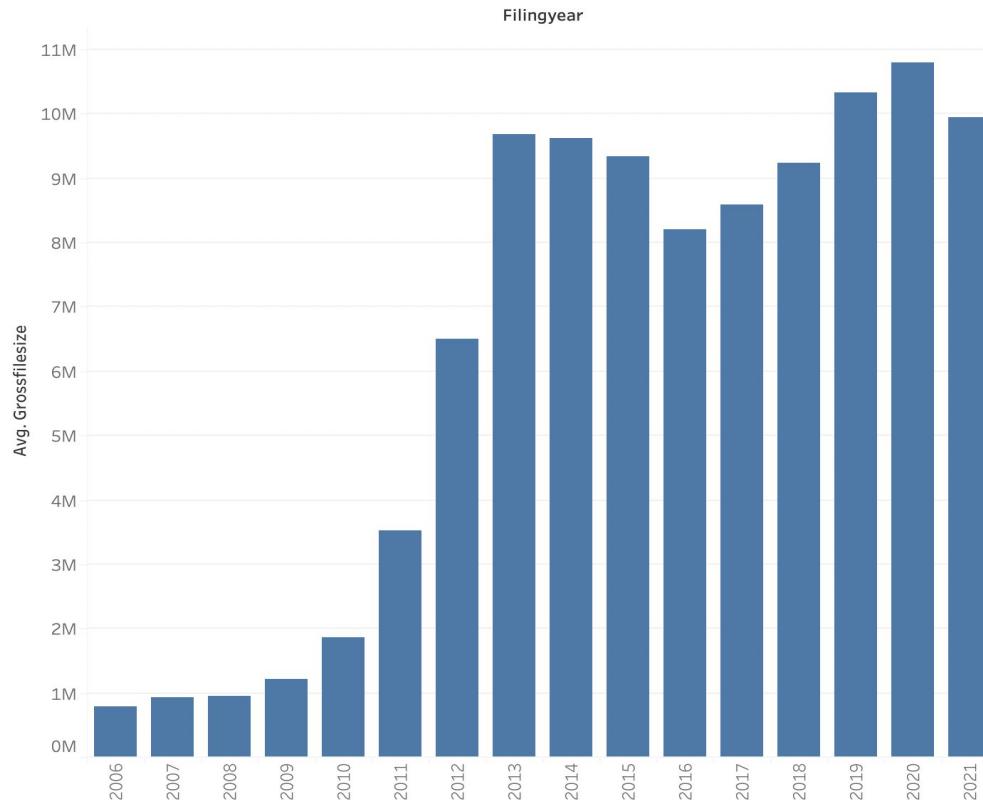
KS Cut-Off



01

LM DATA SET

Gross File Size vs Year

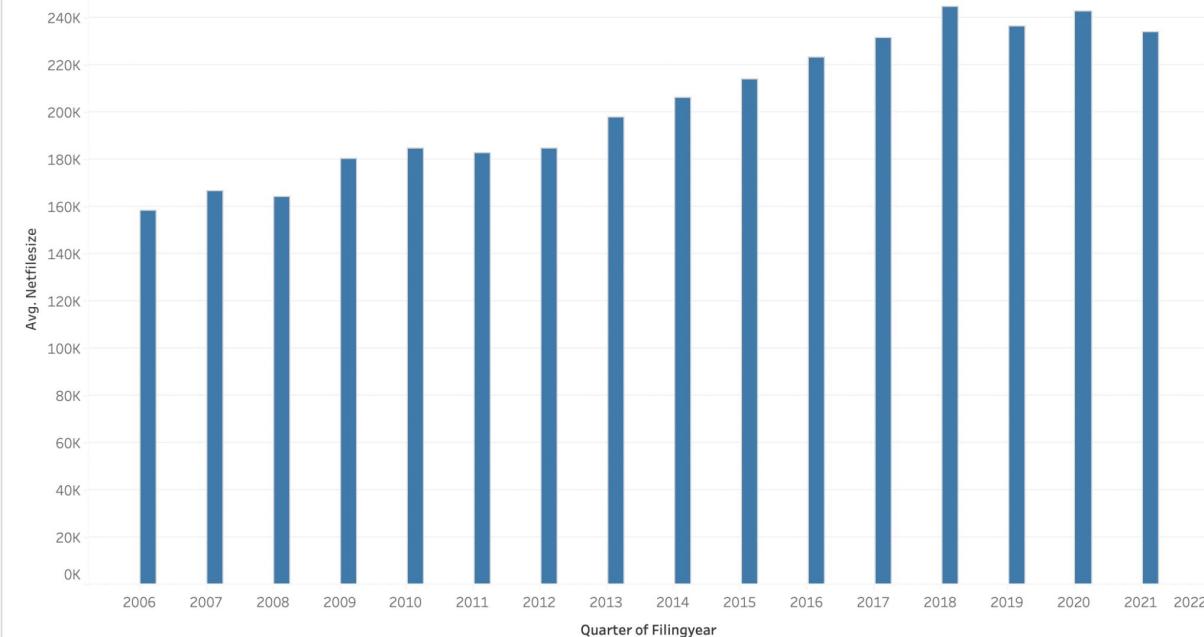


Key finding: Gross file size dramatically increase in 2010

- Firms start to file their 10-Ks with XBRL tabs in 2010, which cause large increase in the disclosure quantity and file size
- Explained why there's sudden increase in gross file size but not in the net file size, because gross file size include all the tabs, tables and exhibits.

Net File Size vs Year

NetFileSize vs Year

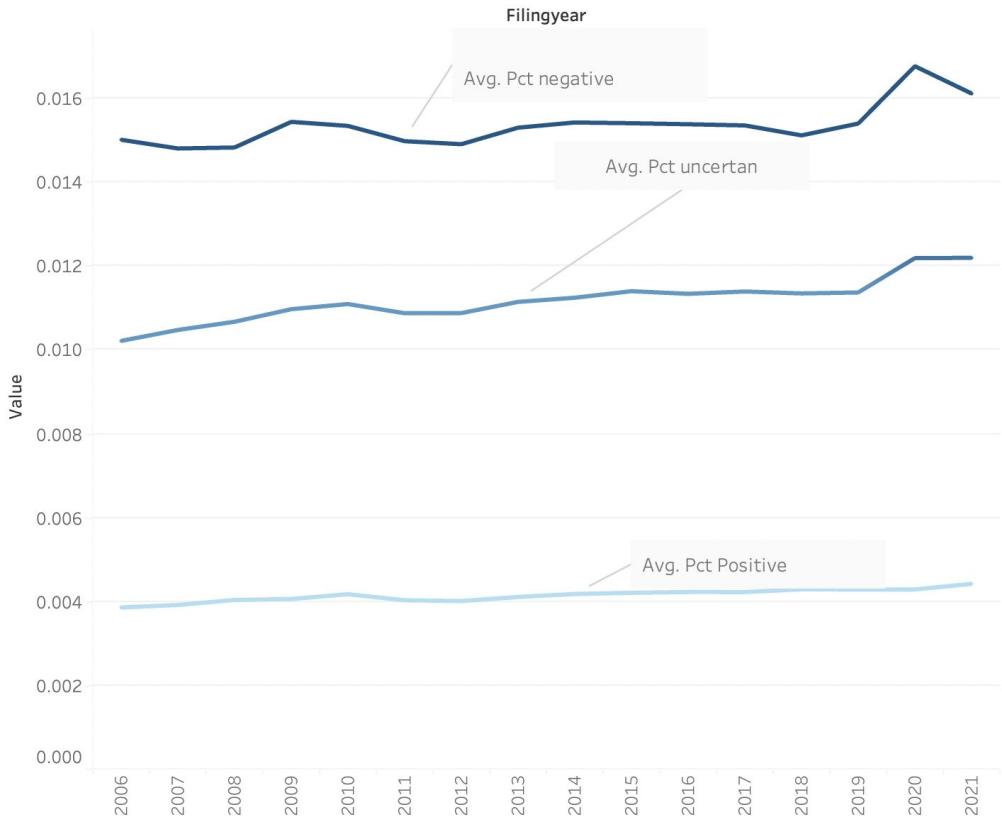


Key Finding: Net file size gradually increase over years without big fluctuation

- The graduate increase in net file size can indicate the firms are increasingly become transparent, and more willing to provide detailed information about company's operation and financial performance.

Pct_data change by year

Pct_positive & Pct_negative & Pct_uncertain change by year

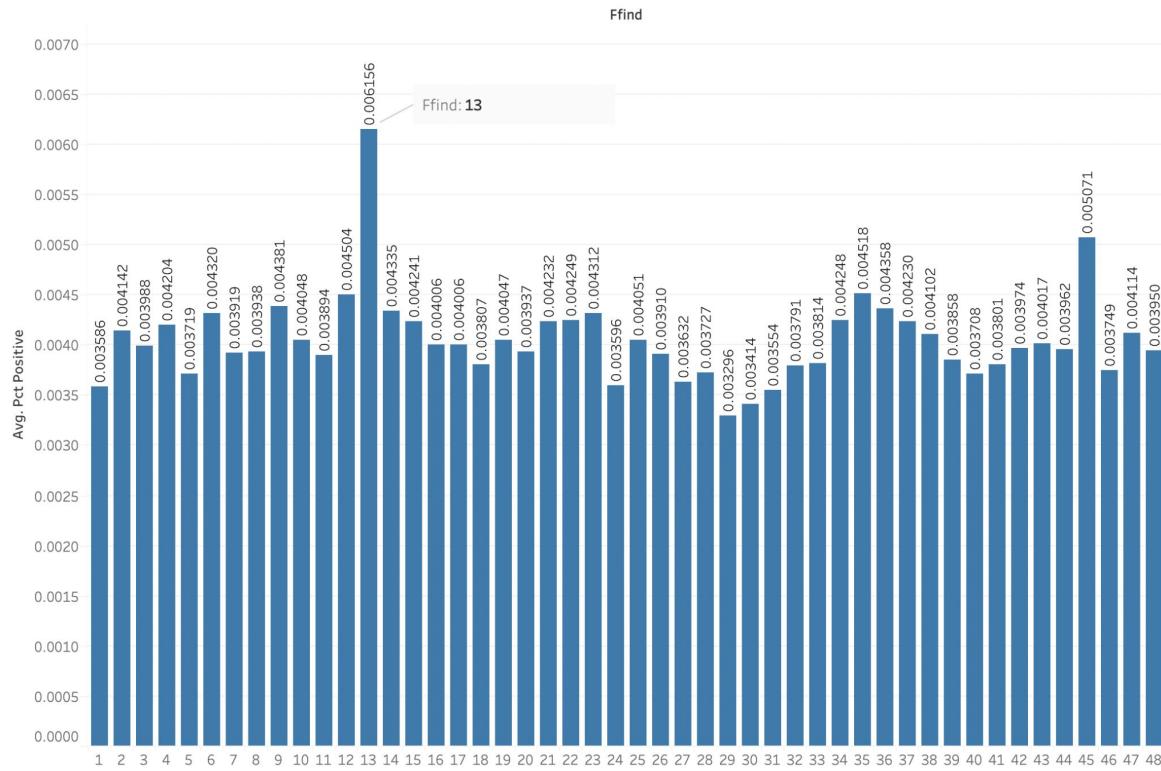


Key Finding: Sudden increase in percent of negative words and percent of uncertain words in 2019

- COVID -19 breakout by the end of the 2019, cause the uncertainty in industry outlook and overall poor performance in most firms
- Percent of positive words mostly stay constant over the years

Industry with highest Pct_Positive

Industry with Highest Pct_Positive



Ffind:13

Industry: **Pharmaceutical Products**

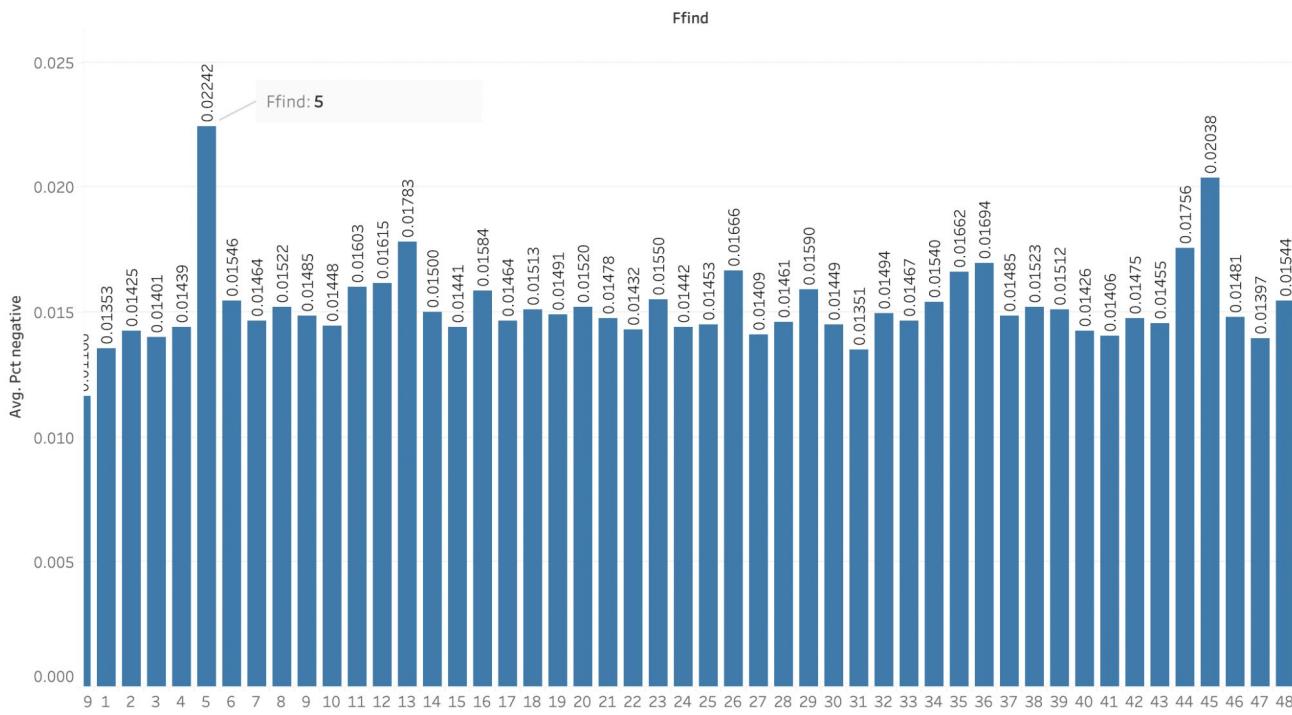
Average Pct_Positive: **0.006156%**

Potential explanations:

- Importance of health influence the positive attitudes of stakeholders have on the pharmaceutical products
- Technology and medical innovations and achievements has increased the confidence on the pharmaceutical products industry

Industry with Highest Pct_Negative

Industry with Highest Pct_Negative



Ffind: 5

Industry: **Tobacco Product**

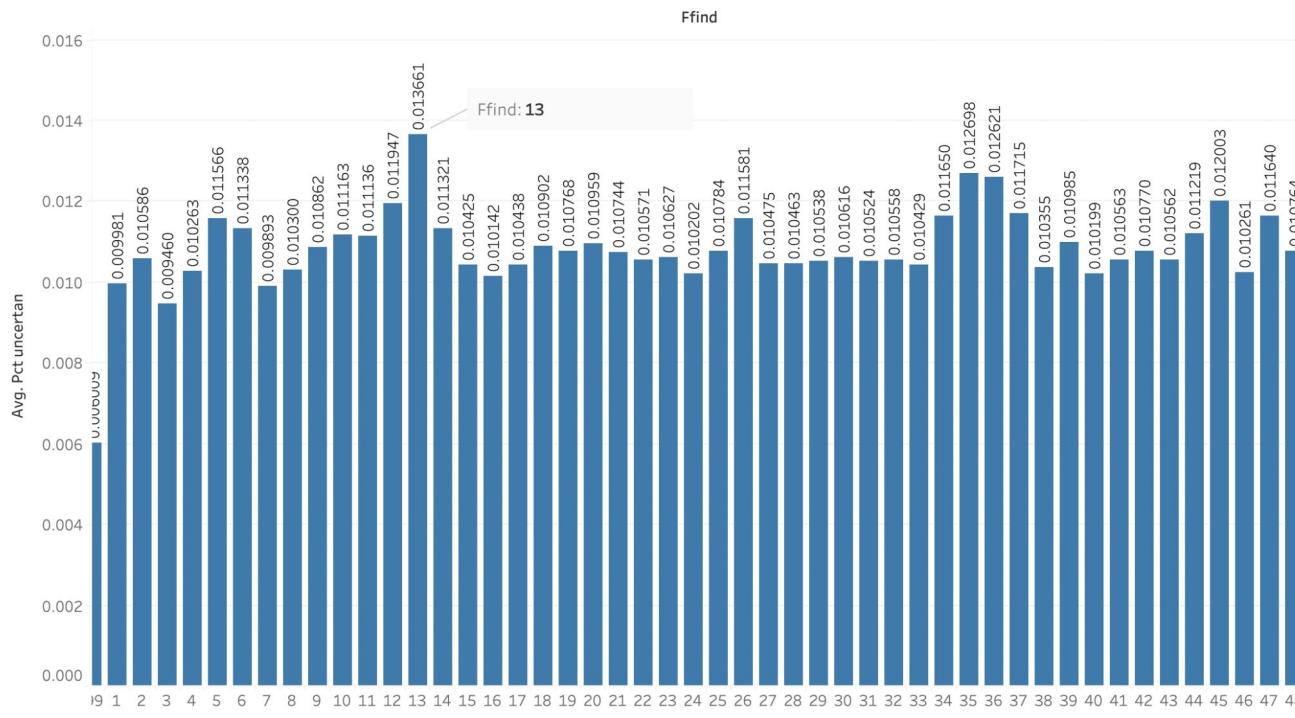
Average Pct_Negative:
0.02242%

Potential explanations:

- Health concerns about negative impact of tobacco influence the languages used in the report
- Negative words can also reflect legal and regulatory challenges, and poor media perception on tobacco product.

Industry with highest Pct_Uncertain

Industry with highest Pct_Uncertain



Ffind:13

Industry: Pharmaceutical Products

Average Pct_Uncertain:
0.01366%

Potential explanations:

- Uncertainty related to change in regulations and regulatory approval process for new products
- Uncertainty regarding the successfulness of the clinical trials and development of new pharmaceutical products

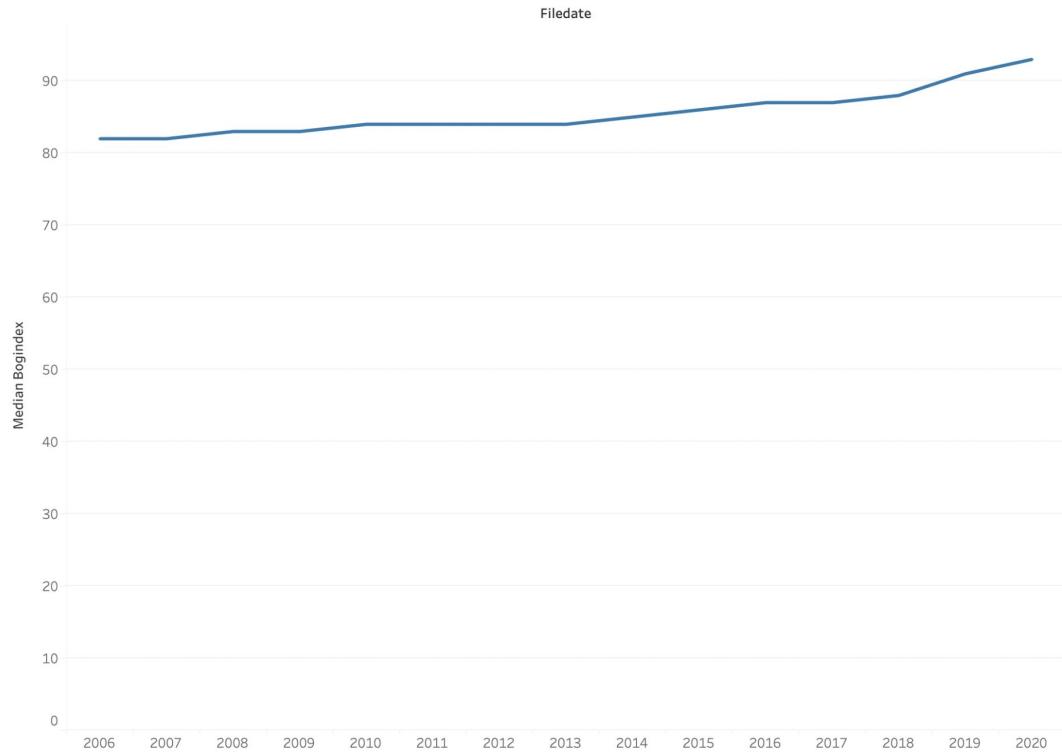


02

BOG DATA SET

Trend of BOG Index

Trend of BOG Index



The Trend is steadily increase between 2006 to 2020 which indicates that the 10-K form are more and more difficult to read. The company is likely to decrease the readability of 10-K to cover up fraud behaviors

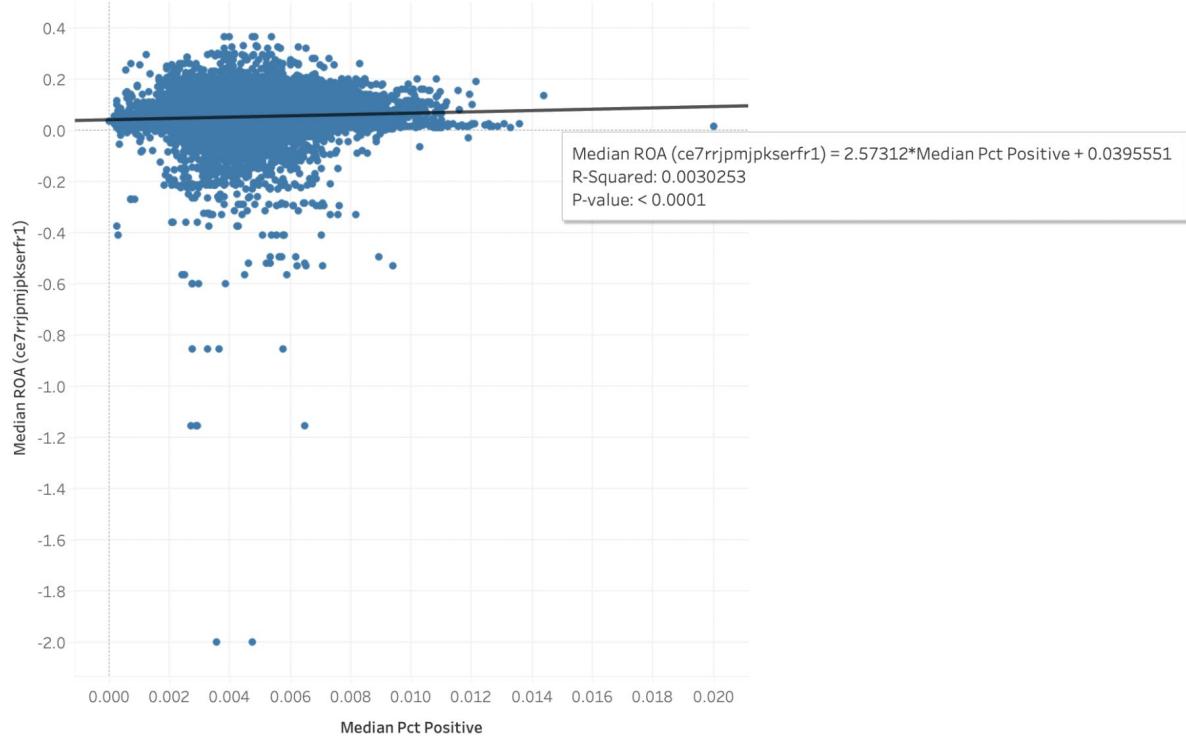


03

MERGE COMPUSTAT DATA SET & LM DATA SET

ROA vs Percent of Positive Words

ROA vs percentage of positive word



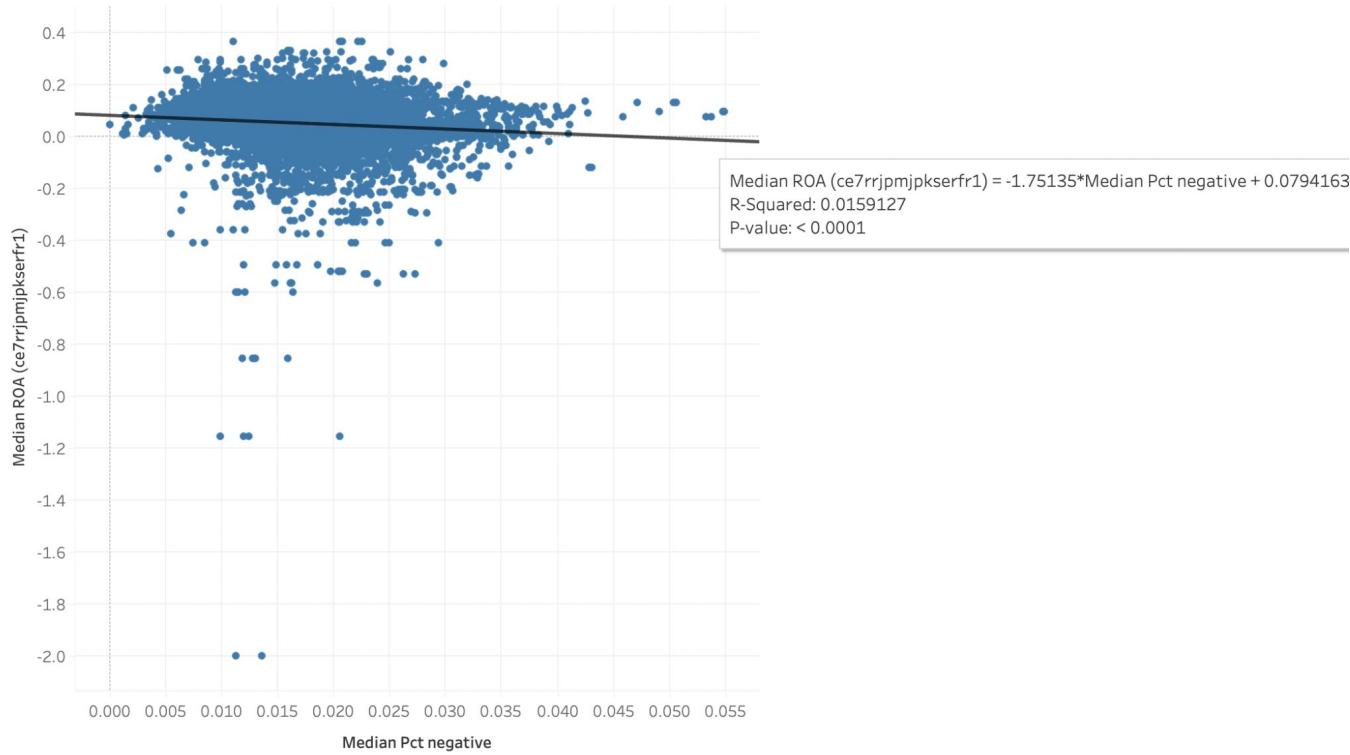
Negligible positive correlation:

Overall, it appears that a higher 1% of positive words tend to come up with 2.57 higher ROA. Positive words indicate that the company is doing well. However, the relationship is super weak since R-squared is smaller than 0.1 and not statistically significant since $p < 0.05$

Most of the data are stacked on the left sides of x-axis

ROA vs Percent of Negative Words

RoA vs percentage of negative word

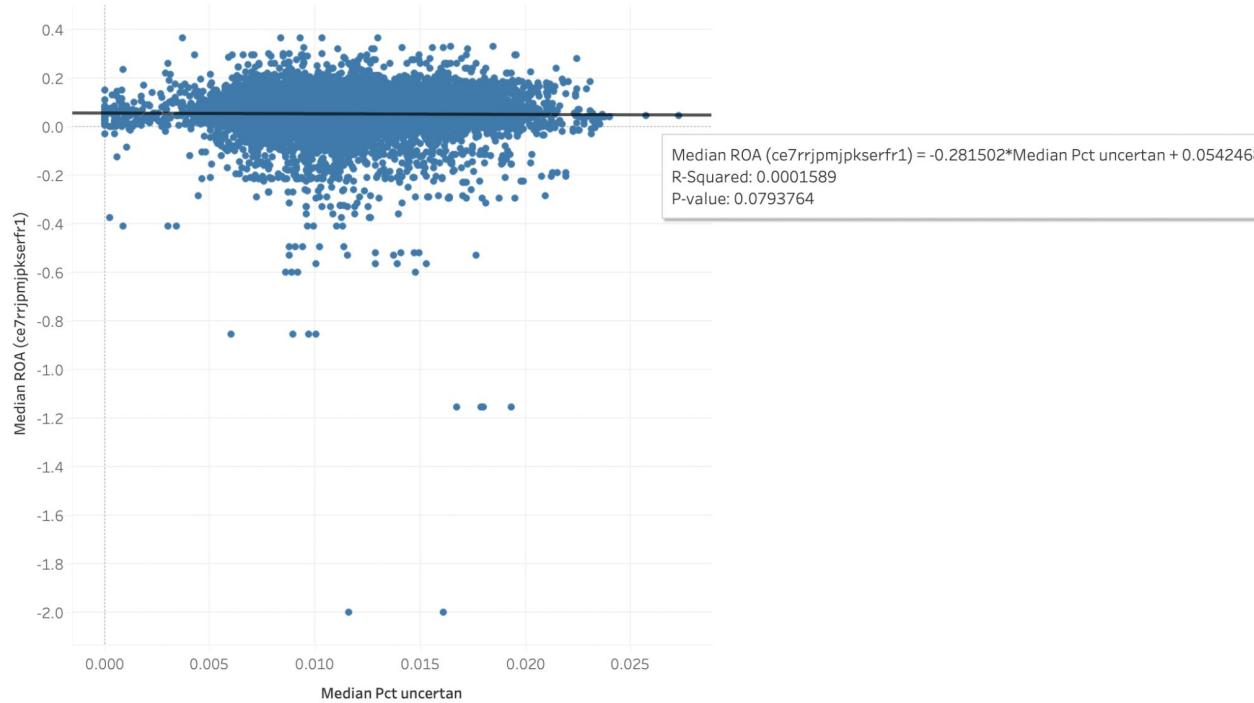


Negligible negative correlation

Overall, it appears that a higher 1% of negative words tend to come up with 1.75 lower ROA. Negative words indicate that the company is doing bad. However, the relationship is super weak since R-squared is smaller than 0.1 and not statistically significant since p<0.05

ROA vs Percent of uncertain words

RoA vs percentage of negative word



No clear correlation

R-square is really close to zero so there is no clear correlation between two variables.

Y axis almost stays the same as x is increasing.

Comment on Findings

According to the trend lines' slope. ROA has positive relationship with percentage of positive words. It also has negative relationship with both percentage of negative and uncertain words. However, those relationship all has R square close to zero, we can only say that there are negligible relationship or no clear relationship.

Thus, Pct_psositive, Pct_negative and Pct_uncertain can't explain much of the variability of ROA. The amount of positive, negative and uncertain words in 10-K cannot explain the performance of the company(return of asset).

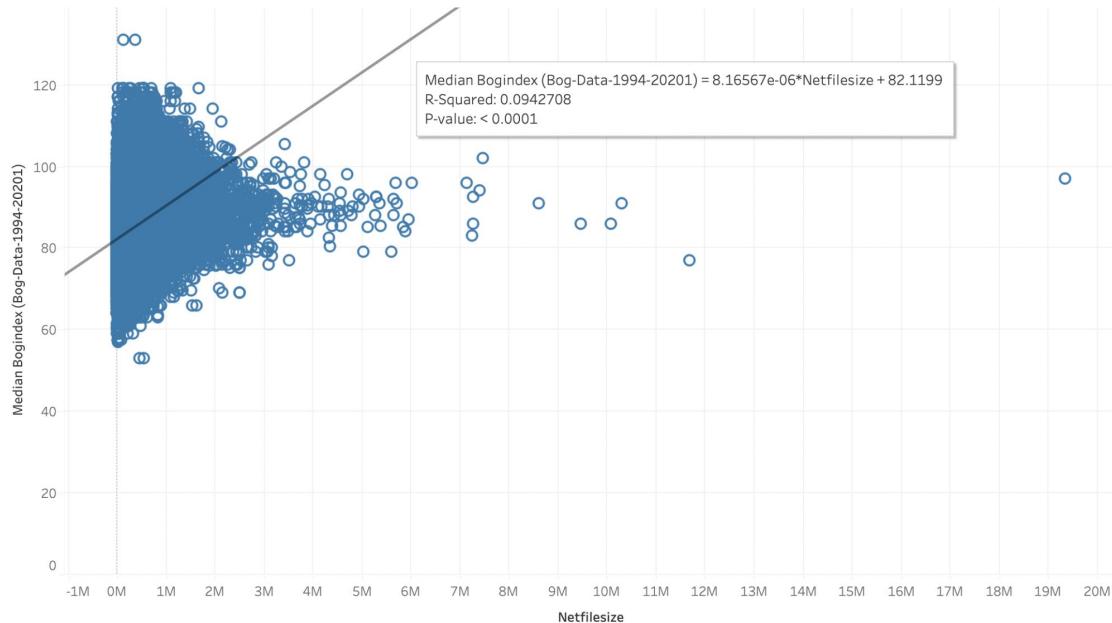


04

MERGE BOX INDEX & LM DATA SET

BOG Index vs Net File Size

Net file size vs bog index

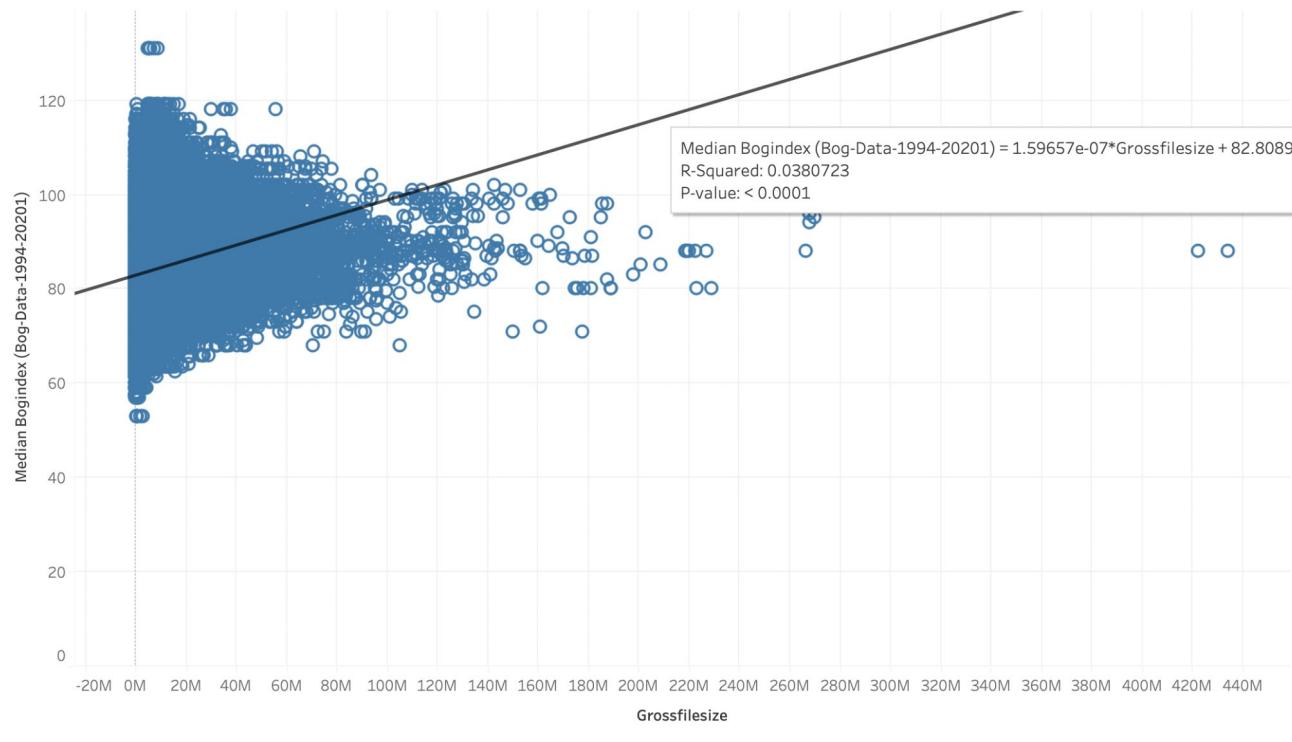


Negligible positive relationship
R square 0.0943

- Positive slope shows as the net file size increase, BOG index increase, however, there's minimal relationship between BOG index and net file size. It indicates that how big the text file is or how much text in the report cannot truly reflect the readability of the document
- The company that has biggest file size don't have bigger BOG index.

BOG Index vs Gross File Size

Gross file size vs bog index

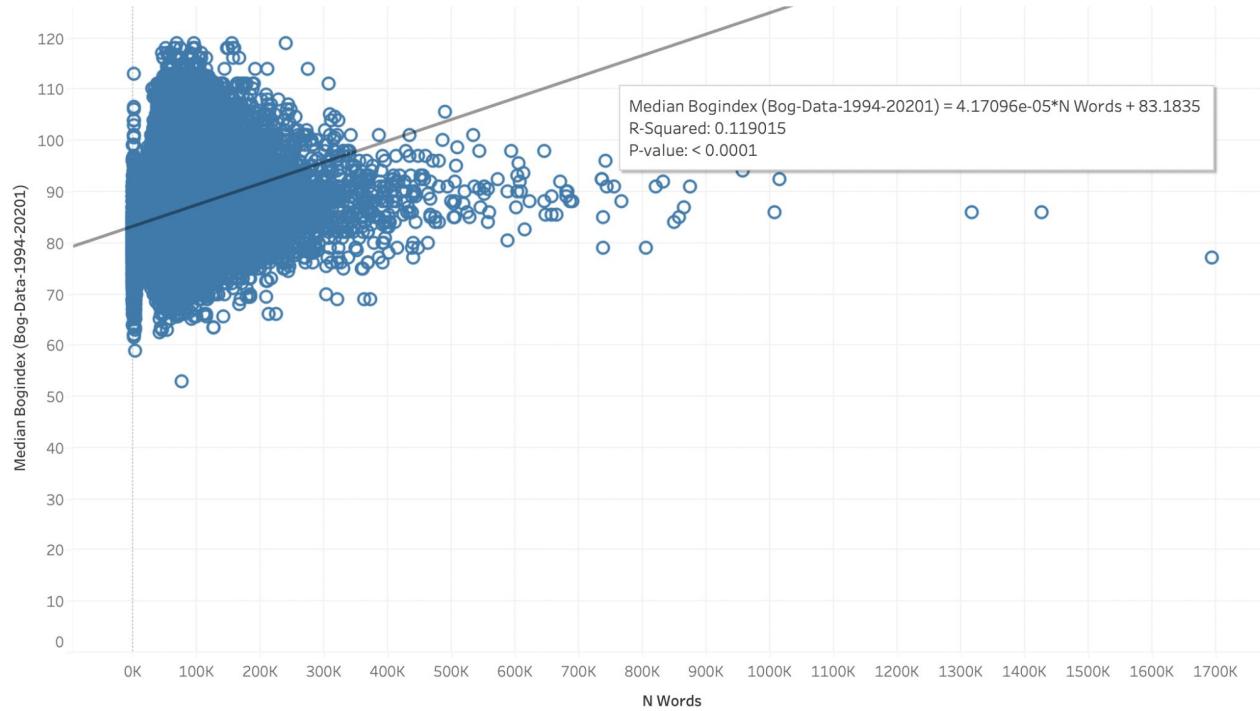


Negligible positive relationship
R square 0.038<0.1

- A higher gross file size tend to come up with higher ROA. However, the relationship is to weak to have any meaningful indication.
- The increasing gross file size doesn't reflect the document begin less readable, which means increasing number of exhibits and tabs does not indicate the readability of the document.

BOG Index vs Total number of Words

Total Number of words vs bog index

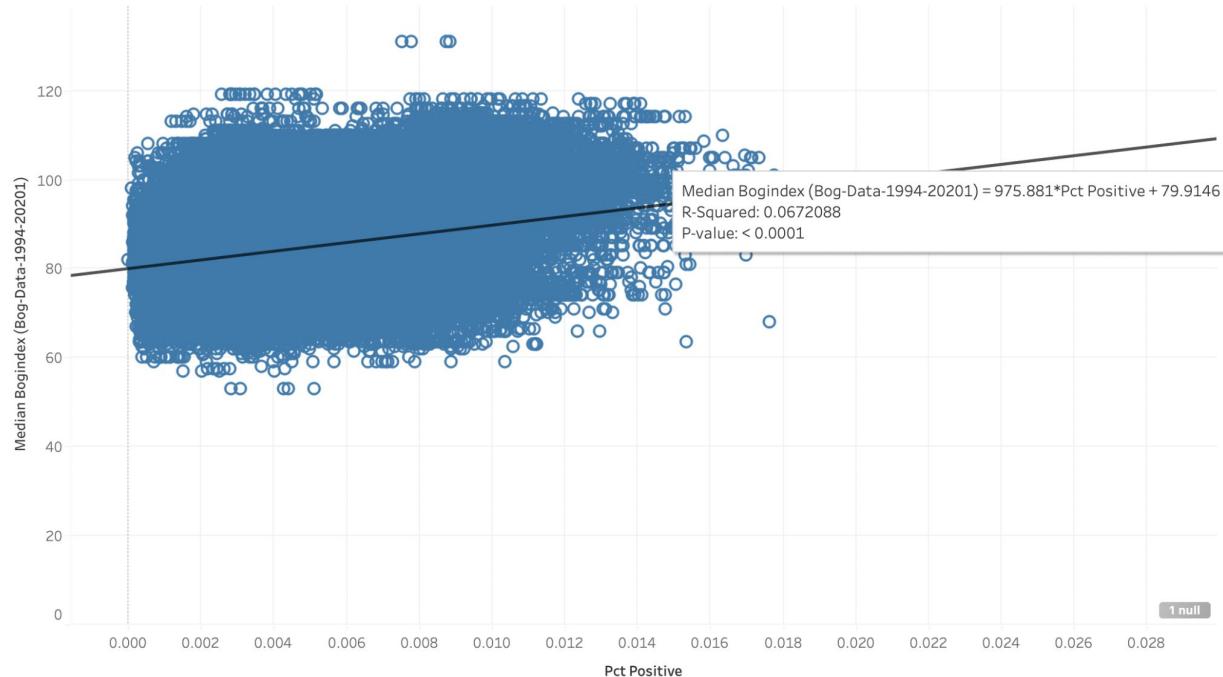


Weak positive relationship
R square 0.119

- The slope and positive r square shows as total number of words increase, BOG index also tend to increase. Weak relationship shows total numbers of words can possibly reflect the readability of the document

BOG Index vs Percentage of positive Words

Percentage psitive words vs bog index

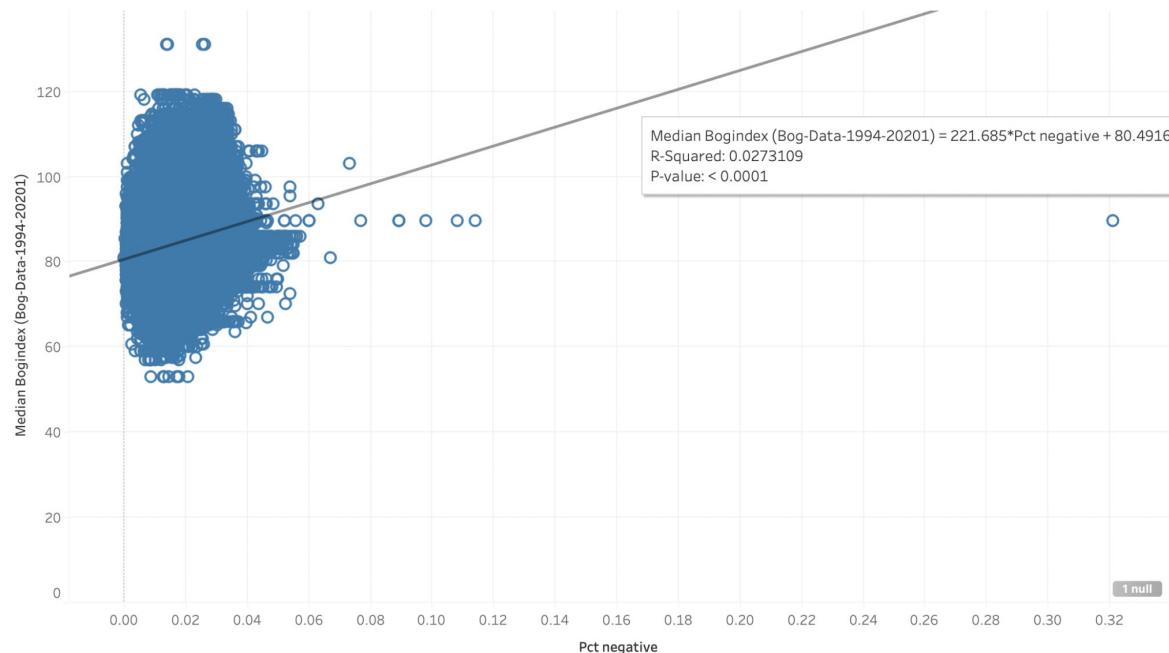


Negligence positive relationship
R square: 0.067

- The positive slope and r square shows as the total number of positive words increase, bog index increase. Excessive positive words may confuse investors. However, the relationship is too weak to draw any meaning conclusion
- Number of positive words cannot indicate the readability of the document

BOG Index vs Percentage of negative Words

Percentage negative words vs bog index

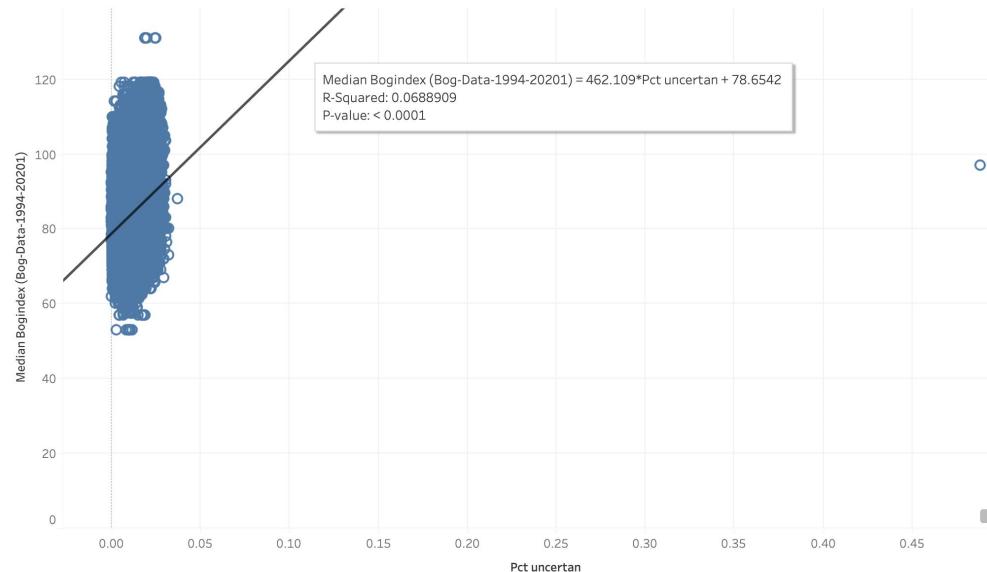


Negligible positive relationship
R square 0.027<0.1

- The slope and positive r square shows as total number of negative words increase, BOG index also tend to increase. Same as positive words, too much negative words may also confuse investors .
- However, the relationship is too weak to draw any meaning solid conclusion
- The data might not be accurate since the company may hide some negative performance.

BOG Index vs Percentage of Uncertain Words

Percentage uncertain words vs bog index



Negligence positive relationship
R square: 0.069

- The positive slope and r square shows that the bog index might increase as the total number of positive words increase. Excessive uncertain words may make it hard for investors to judge the performance of the company. However, the relationship is too weak to draw any meaningful conclusion
- Number of uncertain words cannot solidly indicate the readability of the document

Thank You



CITATION

- "United States District Court Southern District of New York U.S ... - Sec." Accessed February 9, 2023. <https://www.sec.gov/litigation/complaints/2020/comp-pr2020-251.pdf>.
- "Former CEO of Publicly Traded Houston Company Pleads Guilty to Accounting Fraud Scheme." U.S. Department of Justice, 9 Feb. 2023, <https://www.justice.gov/usao-sdny/pr/former-ceo-publicly-traded-houston-company-pleads-guilty-accounting-fraud-scheme>.
- "Former CEO of Publicly Traded Houston Company Sentenced to Three Years in Prison for Accounting Fraud Scheme." U.S. Department of Justice, 9 Feb. 2023, <https://www.justice.gov/usao-sdny/pr/former-ceo-publicly-traded-houston-company-sentenced-three-years-prison-accounting>.
- "SAExploration Successfully Completes Financial Restructuring." GlobeNewswire, 21 Dec. 2020, <https://www.globenewswire.com/en/news-release/2020/12/21/2148955/34359/en/SAExploration-Successfully-Completes-Financial-Restructuring.html>.
- "SAExploration Announces Executive Changes." PR Newswire, 14 Dec. 2020, <https://www.prnewswire.com/news-releases/saexploration-announces-executive-changes-301439641.html>.
- "SAExploration Announces Recapitalization Transaction." PR Newswire, 16 Dec. 2020, <https://www.prnewswire.com/news-releases/saexploration-announces-recapitalization-transaction-301471842.html>.